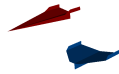




You need 3 pieces of paper



301-18 Design and demonstrate methods for altering drag in flying devices

204-2, 205-5, 207-2

Part 1) I want you to design a glider of your choice. You must use the entire piece of provided paper (Controlled Variable - by folding, you may make slits but we want to keep the weight the same). Once it is complete we are going to get into groups of 4 and take turns throwing the gliders. I want you to record the flight time and flight distance for each glider. Which design flew the best? Why do you think this?

Part 2) Now I want you to switch gliders with a partner and record it's time and flight distance? Was it the exact same or different? If different what variables (ex. force,) may differ the results? (Record your answers) (Outcome 206-6)

Read the info on the site together...then discuss

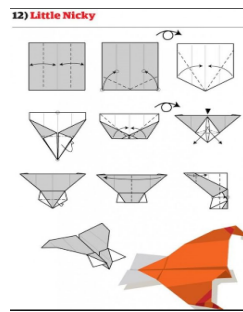
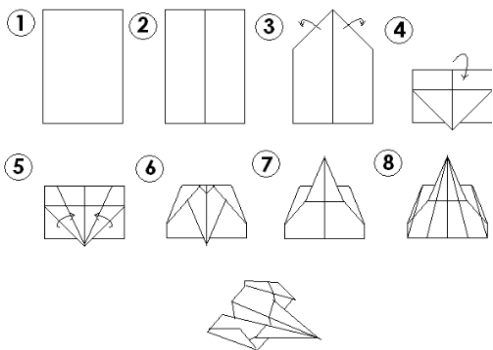
<http://science.howstuffworks.com/transport/flight/modern/glider3.htm>



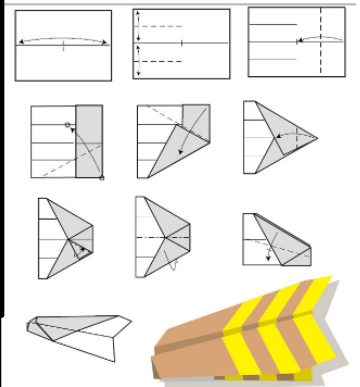
Part 3 - In a group discuss and record on paper the answer to the following "How can I reduce the drag in my glider?"

Part 4 - Design a new glider, as a group that will better reduce drag. (Record what changes were made and why?)

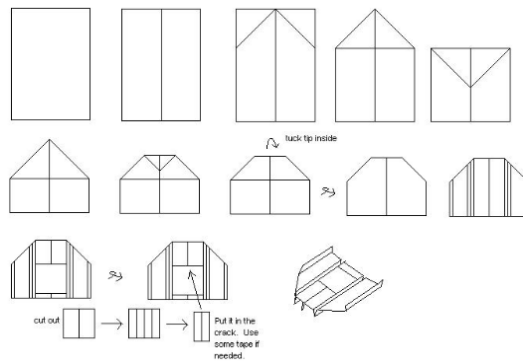
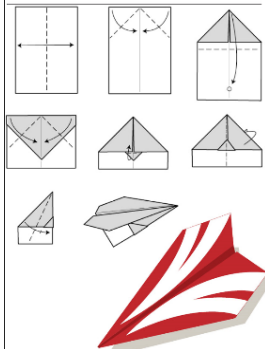
Part 5 - Design a new glider that will either make a loop while flying or turn right or left. Record what changes were made in order to have this happen (May take more than one try)



5) The Delta



2) Glider #2



Drag is a force that pulls back on something trying to move. Drag provides resistance, making it hard to move. For example, it is more difficult to walk or run through water than through air. Water causes more drag than air.

The shape of an object also affects the amount of drag. Round surfaces usually have less drag than flat ones.

Narrow surfaces usually have less drag than wide ones. The more air that hits a surface, the more the drag the air produces.



As an object moves through the air, it pushes aside air molecules.
Credit: NASA

To improve performance (206-6)



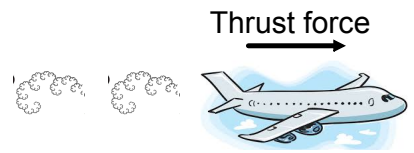
Four Forces of Flight (continued)

3) Lift is a force upward. If the lift force is greater than the gravity force, the object will stay in the air.
(Opposite to gravity)



4) Thrust is the force that moves an airplane forward and usually produced by a planes engines.

(Opposite to Drag)



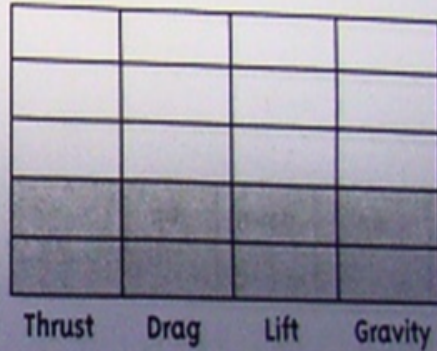


Book Computer lab
Webquest

How Airplanes Fly | The Four Forces of FLIGHT!

What's Happening Sheet

These graphs show how the four forces relate to each other in different flight situations: stopped on the ground, going up, flying level, and going down. You know, for example, that when a plane is flying level, the four forces are balanced. That means that lift is exerting the same amount of force as gravity is, and thrust is as strong as drag. The graph on the right shows those relationships.



Beside each graph below, put the letter of the indicated flight situation:

- (a) on the ground (b) going up
(c) flying level (d) going down

